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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/539,892

06/17/2005

Zhanping Xu

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EXAMINER

HENN, TIMOTHY J

ART UNIT

PAPER NUMBER

2622

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DELIVERY MODE

09/03/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/539,892	Applicant(s) XU ET AL.	
	Examiner Timothy J. Henn	Art Unit 2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 June 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 11-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 11-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The subject matter of this application admits of illustration by a drawing to facilitate understanding of the invention. Applicant is required to furnish a drawing under 37 CFR 1.81(c). No new matter may be introduced in the required drawing. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d).

Specification

2. The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

Arrangement of the Specification

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

- (a) TITLE OF THE INVENTION.
- (b) CROSS-REFERENCE TO RELATED APPLICATIONS.
- (c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
- (d) THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT.
- (e) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC.
- (f) BACKGROUND OF THE INVENTION.
 - (1) Field of the Invention.
 - (2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
- (g) BRIEF SUMMARY OF THE INVENTION.
- (h) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
- (i) DETAILED DESCRIPTION OF THE INVENTION.

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- (j) CLAIM OR CLAIMS (commencing on a separate sheet).
- (k) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
- (l) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 11, 13, 15 and 16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

[claim 11]

5. Claim 11 recites the limitation "preferably adjusted along a predetermined characteristic for the respective number of emitting processes". However, it is unclear whether such an adjustment is actually required by the claim. For the purposes of art rejection, the claim will be read as not requiring the adjustment (i.e. the adjustment will be considered optional).

[claim 13]

6. Claim 13 recites the limitation "the external connection for illuminating the scene is interrupted" in lines 5 and 6 of the claim. There is insufficient antecedent basis for this limitation in the claim. Since it is unclear what is meant by "the external

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connection", this limitation will not be considered for the purposes of art rejection

[claims 15 and 16]

7. Claims 15 and 16 provides for the use of the method of claim 1, but, since the claim does not set forth any steps involved in the method/process, it is unclear what method/process applicant is intending to encompass. A claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced.

Claims 15 and 16 is rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd.App. 1967) and *Clinical Products, Ltd. v. Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1, 2 and 12-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schwarte (DE4439298) in view of Hayner (US 4,950,880).

[claim 1]

Regarding claim 1, Schwarte discloses a 3D image sensor comprising a light source (Figure 2, Item 9) emitting a modulated emitted signal into the viewed scene; and a receiving array consisting of a plurality of pixels, the pixels generating a received signal for every pixel individually from a demodulation signal comprising a predetermined phase position with respect to the emitted signal and from the detected radiation reflected by the scene, the received signal being used as a measure of distance (Figure 2, Item 23; Abstract). However, Schwarte does not disclose calibrating the receiving array as claimed.

Hayner discloses a calibration method for a 3D image sensor in which the entire receiving array is exclusively illuminated with a calibrating radiation comprising a phase position which is at least largely homogeneous for all pixels and that the occurring received signals of the individual pixels are evaluated (Figure 1; c. 7, l. 22 - c. 8, l. 41; c. 12, ll. 5-59). Such a process ensures that the array of receivers is in coherent alignment. Therefore, it would be obvious to calibrate the 3D image sensor of Schwarte using the method taught by Hayner to ensure that the array of receivers maintains coherent alignment resulting in more accurate measurements. Since the image sensor of Schwarte uses light with a modulated signal, it would further be obvious to include such a modulation and demodulation process in the calibration method of Hayner.

[claim 2]

Regarding claim 2, Hayner discloses detecting the relative phase deviation between the pixels (c. 7, ll. 50-68).

[claim 12]

Regarding claim 12, Hayner discloses that the calibrating radiation is generated by a further light source exclusively illuminating the entire receiving array at defined intervals (Figure 1, Item 33; c. 12, ll. 35-39).

[claim 13]

Regarding claim 13, Hayner discloses calibration radiation which is generated by an already existing light source (e.g. Figure 1, Item 33 already exists), wherein the radiation is deflected from the light source to the receiving array (Figure 1).

[claim 14]

Regarding claim 14, Hayner discloses storing the phase deviation information in the array of optical receivers to modify the calculations used to determine phase (c. 12 ll. 49-59). As broadly as claimed, these parameters can be considered part of a lookup table.

[claims 15 and 16]

Regarding claims 15 and 16, Schwarte in view of Hayner does not explicitly disclose the use of the method of claim 1 for sensing in motor vehicle environments or in connection with industrial facilities. However, Official Notice is taken that the use of 3D sensing in these applications is well known in the art. Therefore, it would be obvious to apply the calibration method of claim 1 to these sensing applications so that the accuracy of the 3D images sensed could be increased as taught by Hayner.

10. Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schwarte (DE4439298) in view of Hayner (US 4,950,880) in view of Lange et al.

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(Proc. SPIE).

[claim 11]

Regarding claim 11, Schwarte in view of Hayner does not disclose a second measurement carried out using a second phase position between the calibrating radiation and the demodulation signal, the second phase position differing from the first phase position. Lange discloses that different types of time-of-flight imaging can be applied, including homodyne operation where only a single frequency is used as well as heterodyne operation where more than one modulation frequency is used. Therefore, it would be obvious to use a heterodyne operation as an alternative method of imaging wherein a second phase relationship (i.e. a second modulation frequency) is used in the system of Schwarte in view of Hayner since such an operation is a known art equivalent.

[claim 12]

Regarding claim 12, the modulation frequency and phase relationships of Schwarte in view of Hayner in view of Lange are inherently freely selectable as claimed (i.e. in theory, any modulation may be used for the light source).

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy J. Henn whose telephone number is (571)272-7310. The examiner can normally be reached on M-F 11-7.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lin Ye can be reached on (571) 272-7372. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Timothy J Henn/
Primary Examiner, Art Unit 2622